What is claimed is:

1. A method for the closed loop control of fiber orientation of a web in a papermaking process comprising the steps of:

a) performing on-line measurements of said fiber orientation;

b) transforming said on-line measurements to a plurality of indices;

c) comparing each of said plurality of indices arising from said transformed on-line measurements with an associated target and deriving therefrom a deviation for each of said plurality of indices from said associated target;

d) computing actions for controlling said fiber orientation based on said derived deviations and a response characteristic of said process; and

e) executing said control actions to minimize said derived deviations.

2. The method of Claim 1 wherein said method further comprises the step of obtaining from said on-line measurements of said fiber orientation a plurality of vectors each of which represent an associated one of a plurality of fiber orientation profiles and said transforming step includes the step of transforming each of said plurality of vectors to an associated one of said plurality of indices.

3. The method of claims 2 wherein each of said plurality of fiber orientation profiles $p(z)$ is transformed by the equation:

$$y = \frac{\int_{z_1}^{z_2} p(z)h(z)dz}{\int_{z_1}^{z_2} h^2(z)dz}$$

with a selected reference function $h(z)$ to produce an associated one of said plurality of indices.

4. The method of Claim 3 wherein each of said

plurality of fiber orientation profiles has individual data points and one of said plurality of indices is an average of all of said individual data points that are part of said associated one of said plurality of vectors.

5. The method of Claim 3 wherein another of said plurality of indices is an indication of the tilting of said associated one of said plurality of vectors.

6. The method of Claim 3 wherein another of said plurality of indices is an indication of the concavity of said associated one of said plurality of vectors.

7. The method of Claim 3 wherein another of said plurality of indices is a signature of the variability of said associated one of said plurality of vectors.

8. The method of Claim 1 wherein said computing step is responsive to said plurality of deviations of indices from said associated targets as inputs for computing one of said control actions as an output.

9. The method of Claim 8 wherein said computing step comprises the step of using logic selected from fuzzy or non-fuzzy logic or any combination thereof for computing one of said control actions.

10. The method of Claim 9 wherein said fuzzy logic comprises at least two of said inputs and one of said output with a plurality of fuzzy rules and a plurality of membership functions associated to each linguistic descriptions.

11. The method of claim 9 wherein said non-fuzzy logic comprises at least a mathematical operation of a weighted sum of a plurality of said inputs for computing one of said control actions.

12. The method of Claim 8 wherein said computing step comprises the step of using a plurality of logic stages for computing one of said control actions.

13. The method of Claim 12 wherein said step of using a plurality of logic stages comprises the step of implementing each of said plurality of logic stages as

logic selected from fuzzy or non-fuzzy logic or any combination thereof.

14. The method of Claim 12 wherein said plurality of logic stages comprises two fuzzy logic stages.

15. The method of Claim 12 wherein said plurality of logic stages comprises at least one stage that is fuzzy logic and at least one other stage that is non-fuzzy logic.

16. The method of Claim 1 wherein said executing step comprises the step of applying said control actions to control a papermaking machine having one or more headboxes.